

(21) Application No 9123827.9

(22) Date of filing 08.11.1991

(30) Priority data
(31) 904036

(32) 08.11.1990

(33) IE

(51) INT CL⁵

B41J 25/316 15/04

(52) UK CL (Edition K)

B6F FBH FKD F203

(56) Documents cited

GB 2162794 A

GB 2121359 A

US 5030968 A

US 4641980 A

US 4614949 A

(58) Field of search

UK CL (Edition K) B6F FAB FBH FKD FPX

INT CL⁵ B41J 15/04 25/312 25/316

(71) Applicant
Balmaha Limited

(Incorporated in Ireland)

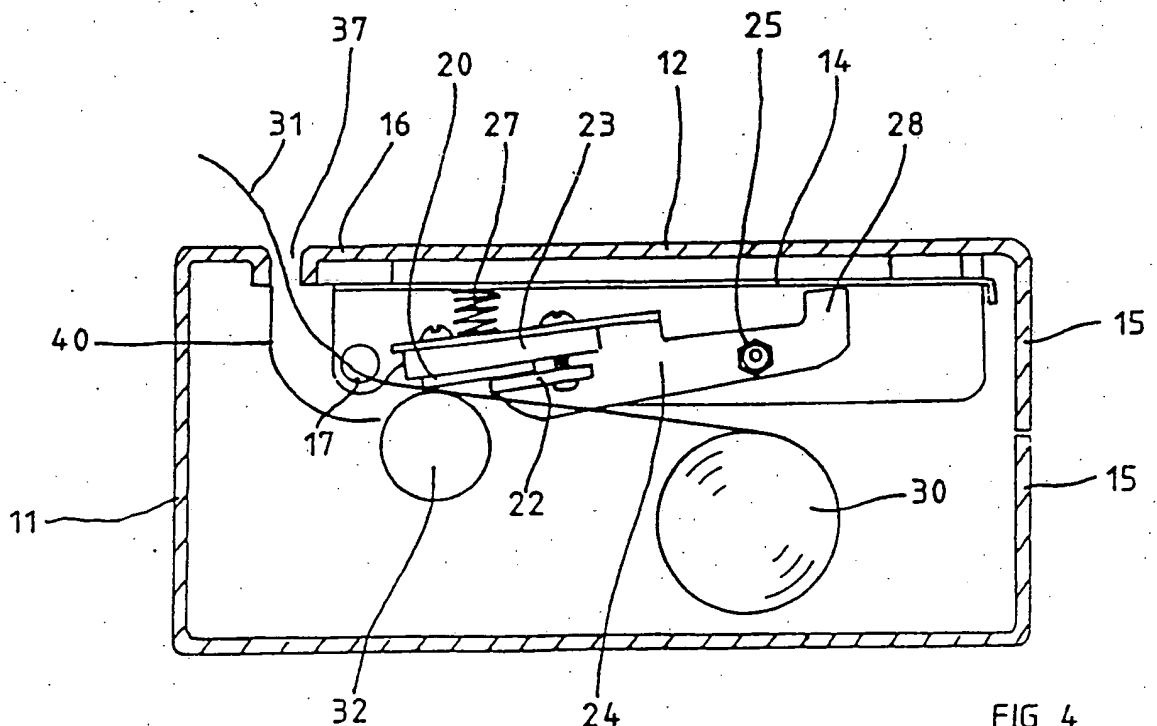
Stillorgan Industrial Estate, Stillorgan, County Dublin,
Ireland

(72) Inventor
John Ferrie

(74) Agent and/or Address for Service
Cruikshank & Fairweather
19 Royal Exchange Square, Glasgow, G1 3AE,
United Kingdom

(54) Mounting a thermal print head in a printer

(57) A housing containing a paper roller 30 has a hinged lid 12 with a thermal print head 20 mounted under the lid. A roller 32 feeds paper 31 past the print head 20. The head 20 is mounted under the lid 12 on a support member 23 which is downwardly biased by springs 27, so that when the lid is closed the print head is brought to bear resiliently against the roller 32. A flexible plastics guide (36, Fig. 2) directs paper 31 from the roll 30 to the roller 32.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

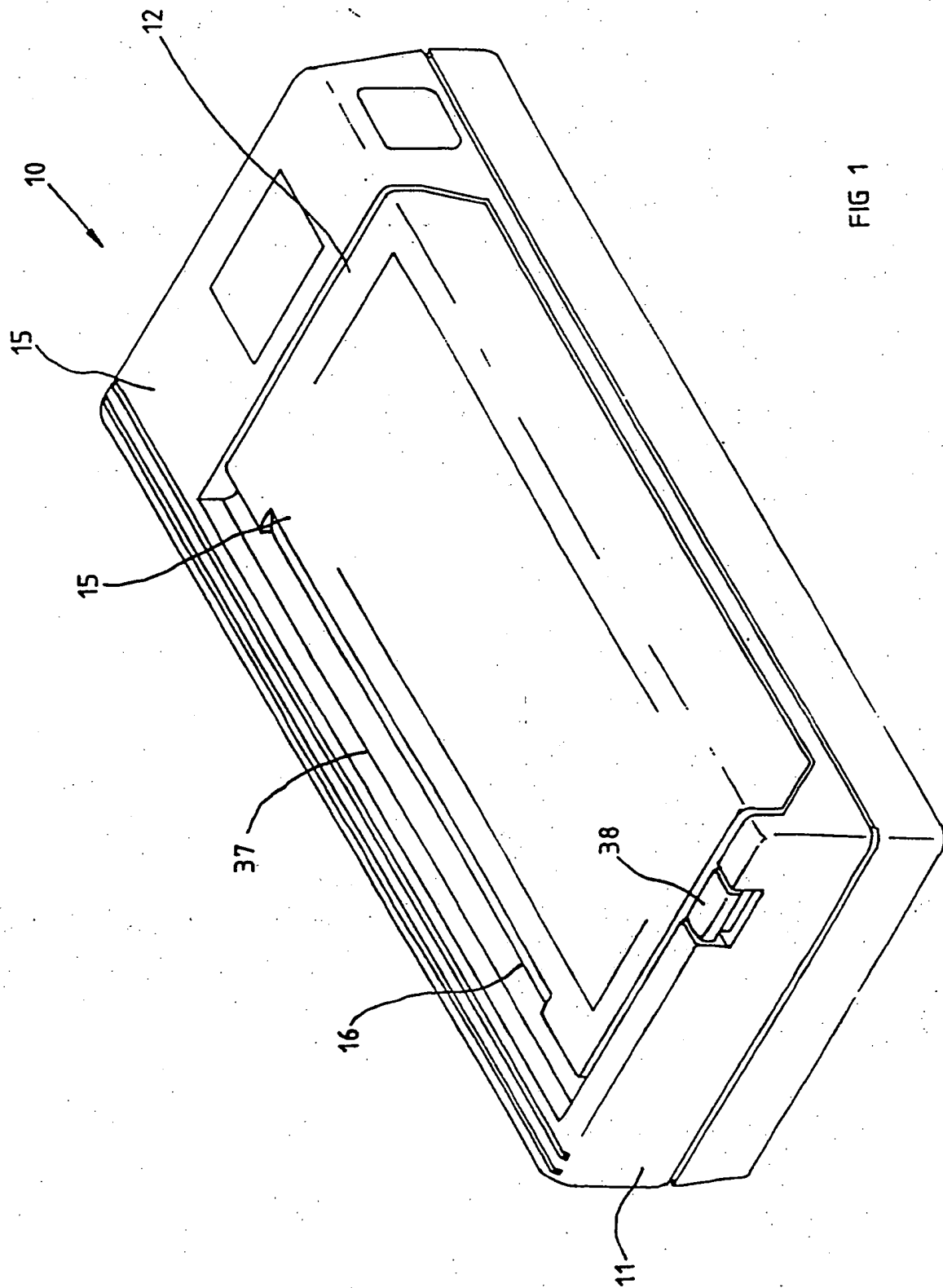


FIG 1

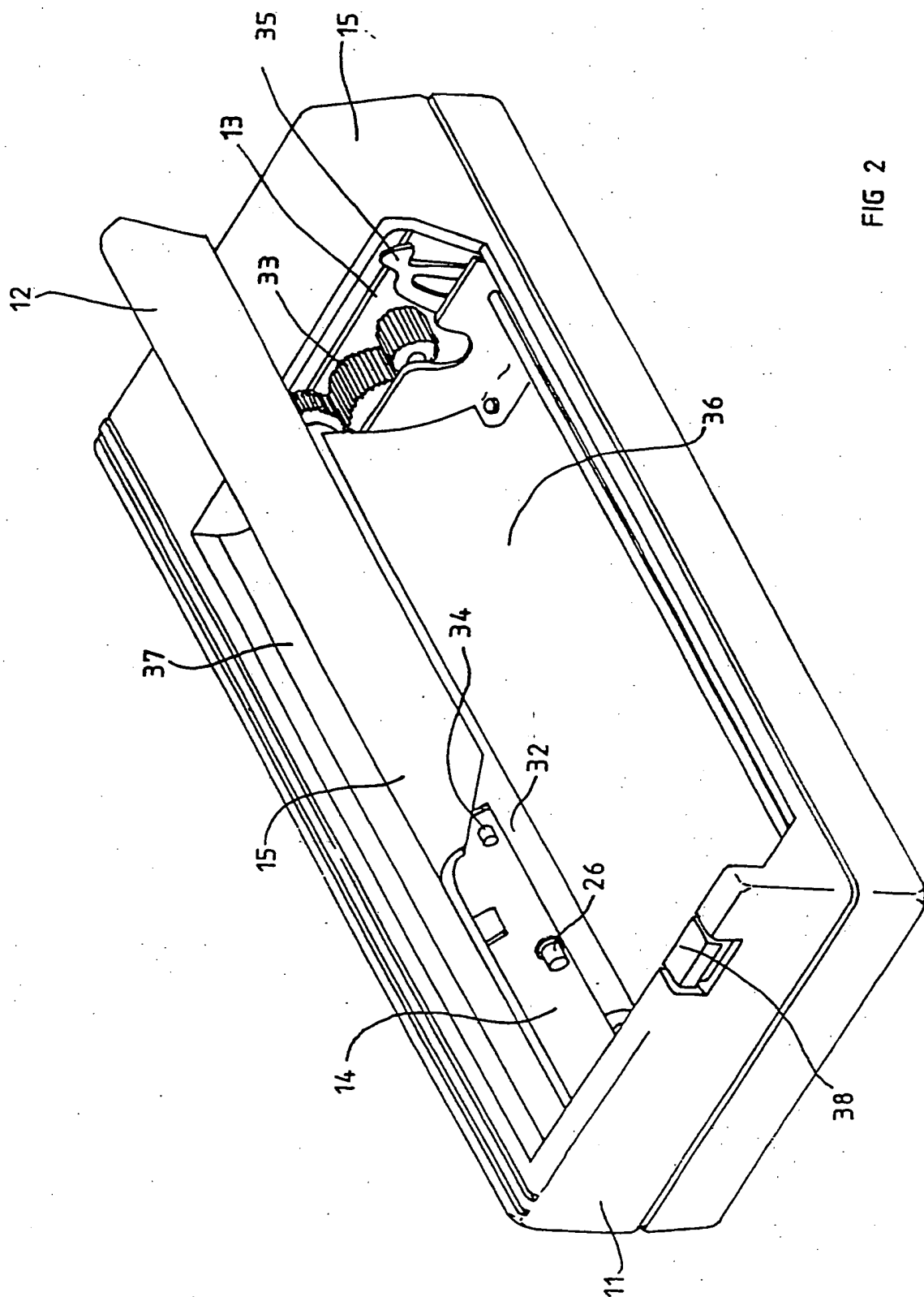


FIG 2

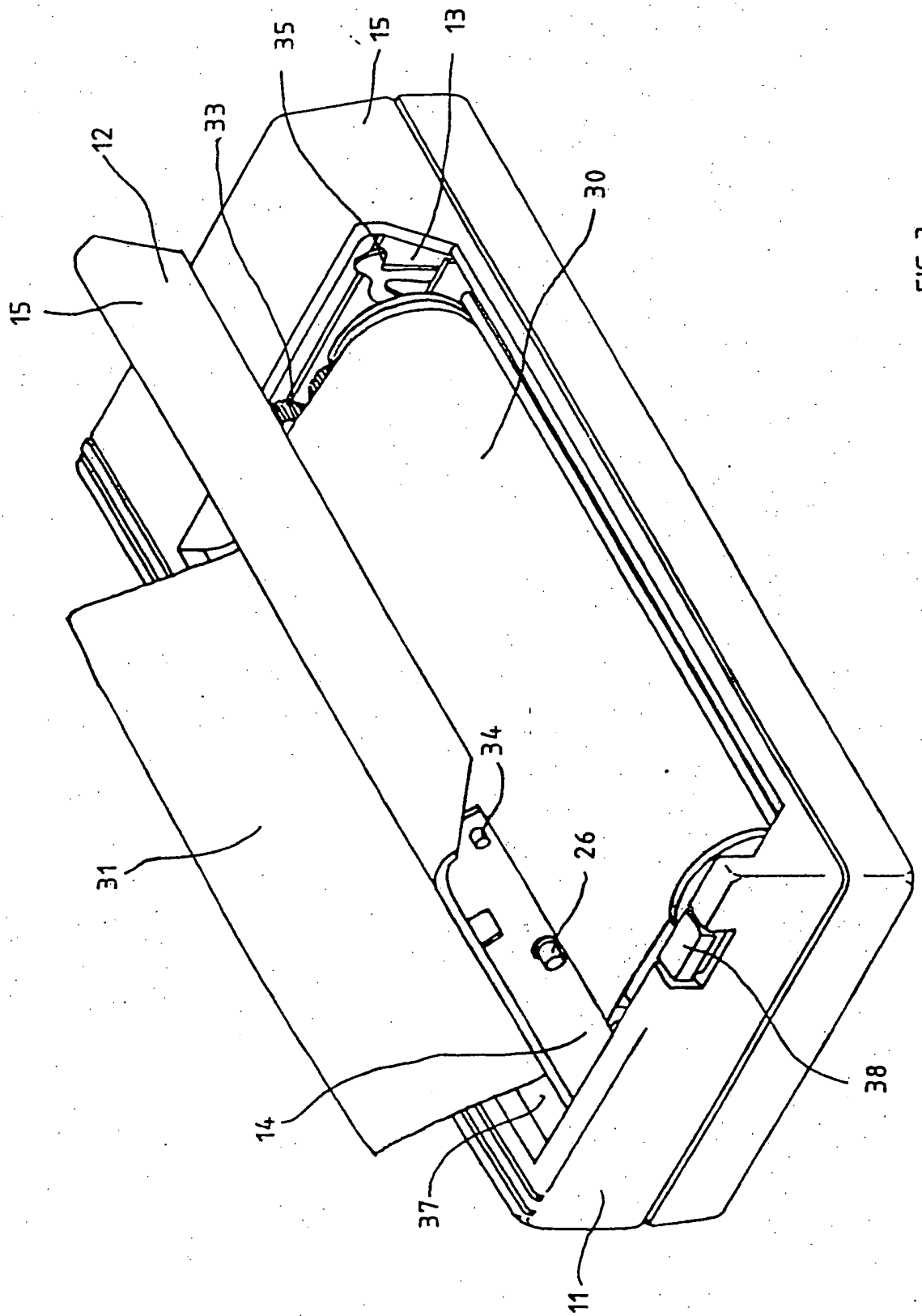


FIG 3

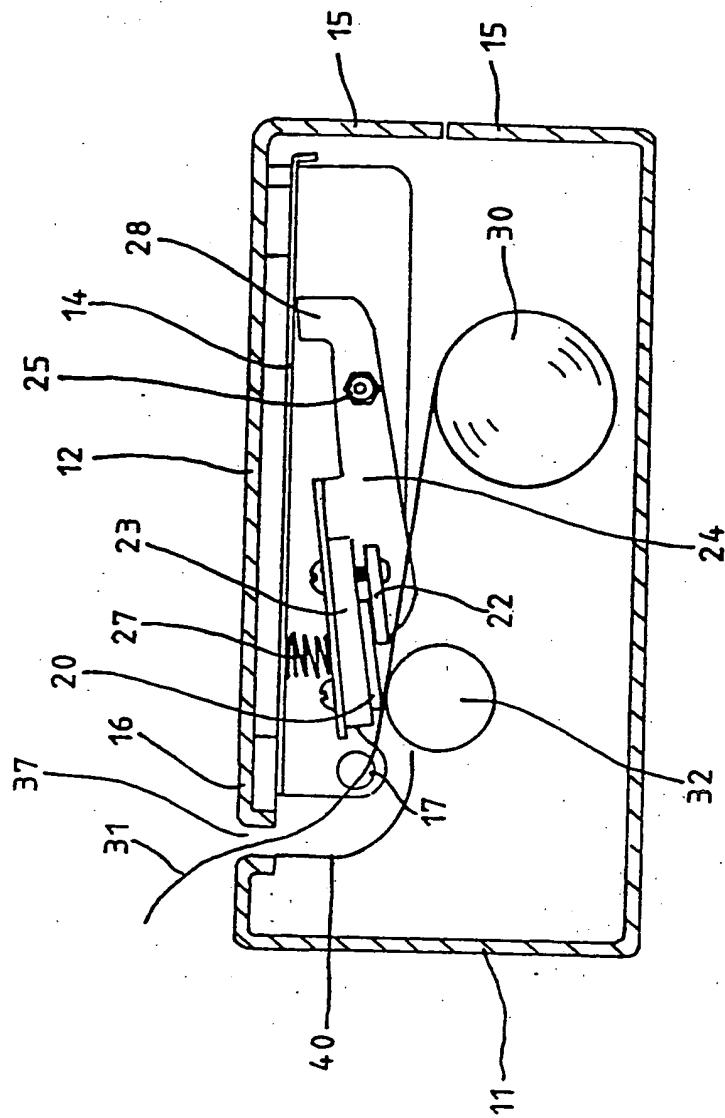


FIG 4

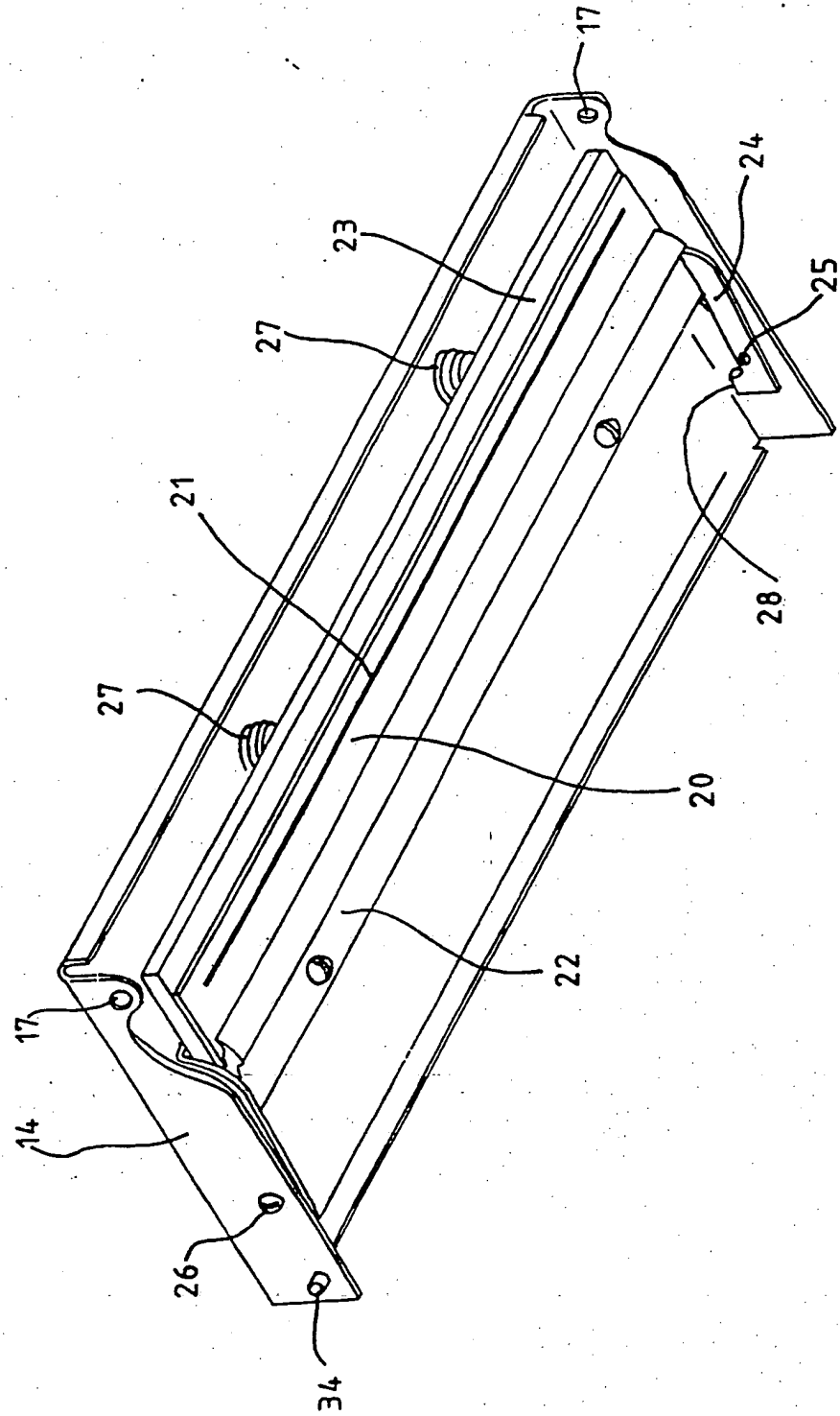


FIG 5

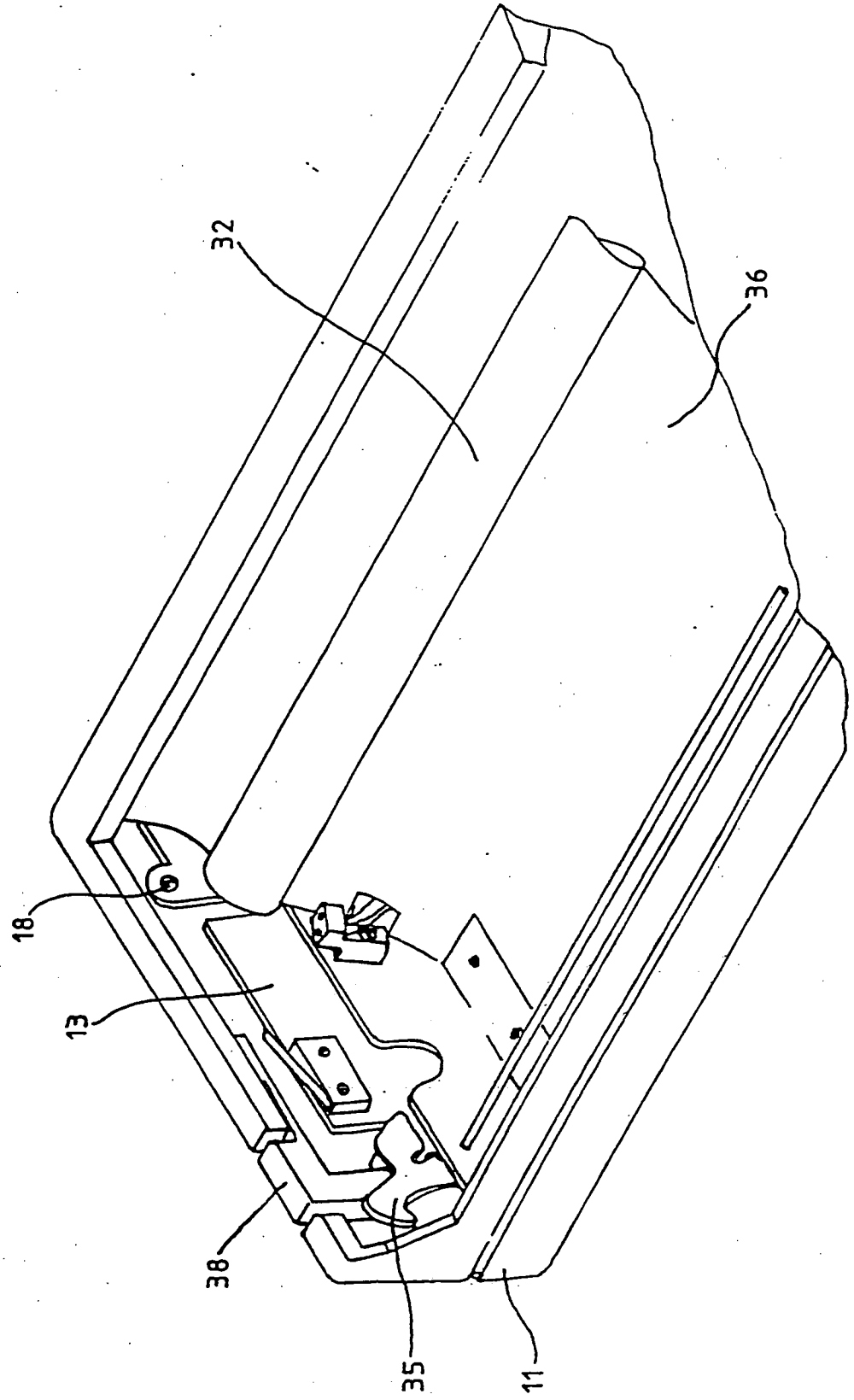


FIG 6

A PRINTER

This invention relates to a printer, in particular to a printer which may be used inter alia as a computer output device.

5 According to the present invention there is provided a printer comprising a housing having a main body portion for containing a roll of paper to be printed and a hinged lid with a thermal print head mounted under the lid, the main body portion further containing a feed roller for frictionally engaging paper
10 from the roll and feeding it past the print head, the print head being mounted under the lid by means which provides a downward spring bias to the print head so that when the lid is closed the print head is brought to bear resiliently against the feed roller.

15 Preferably, the axis of the feed roller is substantially parallel to the axis of the lid hinge, and the print head comprises a linear array of thermal print elements disposed substantially parallel to the axis of the feed roller.

Further, the print head may be carried by a support member which is mounted to the underside of the lid for pivoting about an axis parallel to the axis of the lid hinge, and the spring bias means may comprise at
5 least one spring between the support member and the underside of the lid.

A paper guide may be provided in the form of a sheet of flexible plastics material which is fitted into the main body portion of the housing to curve upwardly
10 from adjacent the base of the body portion into contact with the feed roller.

In the preferred embodiment, when the lid is closed a slot is defined between the edge of the lid and the housing main body portion in the region of, and
15 substantially parallel to, the lid hinge. The slot serves as an exit for the printed paper from the housing.

An embodiment of the invention will now be described by way of example, with reference to the
20 accompanying drawings, in which:

Figure 1 is a perspective view of a printer according to the embodiment of the invention, with the lid closed;

Figure 2 is a perspective view of the printer
25 with the lid open but with no paper in the printer;

Figure 3 is a perspective view of the printer with the lid open and with paper in the printer;

Figure 4 is a cross-sectional view through the printer;

Figure 5 is a perspective view of underneath the printer lid omitting the external plastics lid moulding;
5 and

Figure 6 is a perspective cutaway view of the inside of the printer with the lid removed.

Referring to the drawings, a printer comprises a housing 10 having a main body portion 11 and a lid 12. The main body portion 11 includes an internal metal chassis 13, and the lid 12 includes an internal metal chassis 14 in the form of a shallow inverted tray. The visible external parts 15 of the housing are of moulded plastics material.

15 The lid 12 is hinged adjacent the rear edge 16 to the main body portion 11. The hinging is effected by a straight metal rod (not shown) passing through two pairs of aligned apertures 17, 18 in the lid and body portion respectively, one pair at each side of the lid.

20 An elongate thermal print head 20 is mounted under the lid 12 (see Figures 4 and 5). In particular, the print head 20 comprises a linear array 21 of thermal print elements which is substantially parallel to the axis of the lid hinge as defined by the apertures 17.
25 The print head is mounted under the lid by being clamped, by a clamping strip 22, to an elongate support member 23.

The support member 23 includes a pair of brackets 24, one at each end of the member 23, by which the member 23 is itself mounted under the lid 12. Each bracket 24 is pivoted at a respective nut 25 and bolt 26 to the corresponding side of the chassis 14 in the lid 12. Thus the member 23 is able to pivot as a whole under the lid 12. The pivotal axis, as defined by the bolts 26, is substantially parallel to the axis of the lid hinge.

The support member 23, and hence the thermal print head 20, is spring biased downwardly away from the underside of the lid 12 by two coil springs 27 located under permanent compression between the support member 23 and the chassis 14, the coil springs tending to rotate the member 23 in an anticlockwise direction as referred to Figure 4. The downward motion is limited by stop members 28 formed at the ends of the brackets 24 on the opposite side of the pivot points 25/26 to the member 23.

The main body portion 11 of the housing 10 is adapted to contain a roll 30 of paper 31 to be printed, and has a feed roller 32 for frictionally engaging paper from the roll 30 and feeding it past the print head 20 when the lid 12 is closed. The axis of the feed roller 32 is substantially parallel to the axis of the lid hinge. The feed roller 32 is driven by a gear train 33 from a stepping motor (not shown).

The paper 31 is loaded when the lid 12 is open (Figures 2 and 3) by passing it manually from the roll 30 upwardly and rearwardly across the top of the feed roller 32 and below the thermal print head 20, and out of the housing behind the rear edge 16 of the lid 12.

The lid 12 is then closed by pushing it down until a pair of projecting studs 34 on either side of the lid engage under respective latches 35 provided in the main body portion. When the lid 12 is thus closed, the print head 20 is brought to bear resiliently against the feed roller 32, there being a small degree of relative upward displacement of the print head 20 and support member 23 within the lid 12 against the bias of the coil springs 27. The paper 31 is sandwiched snugly between the feed roller 32 and the print head 20.

The paper is fed past the print head 20, during operation of the printer, by rotation of the feed roller 32 by the stepping motor referred to above, the friction of the feed roller 32 against the paper 31 being greater than the friction of the paper against the relatively smooth print head 20.

A paper loading guide is provided in the form of a sheet of flexible plastics material 36 (Figure 2) which is fitted into the main body portion 11 of the housing to curve upwardly from adjacent the base of the body portion into contact with the feed roller 32.

The paper exits from the housing 10 from a slot 37 in the top of the housing 10 defined between the rear edge of the lid 12 and the housing main body portion 11 in the region of, and substantially parallel to, the lid hinge. A paper exit guide 40 (Figure 4) is provided to guide paper emerging from the rear of the feed roller 32 upwardly to the slot 37.

The closed lid 12 may be opened again by releasing the latches 35 - this is done by pressing a knob 38 on the outside of the housing, the knob being mechanically coupled to the latches.

5 The spring pressure is brought to bear and the head 20 is located in such a fashion that between forward and reverse there is no deterioration of print quality and when opening and closing the lid 12, repeatability and accuracy are controlled and assured with optimum setting achieved each time the lid is closed.

CLAIMS:

1. A printer comprising a housing having a main body portion for containing a roll of paper to be printed and a hinged lid with a thermal print head mounted under the lid, the main body portion further containing a feed roller for frictionally engaging paper from the roll and feeding it past the print head, the print head being mounted under the lid by means which provides a downward spring bias to the print head so that when the lid is closed the print head is brought to bear resiliently against the feed roller.

5

10
2. A printer as claimed in claim 1, wherein the axis of the feed roller is substantially parallel to the axis of the lid hinge, and the print head comprises a linear array of thermal print elements disposed substantially parallel to the axis of the feed roller.

15
3. A printer as claimed in claim 2, wherein the print head is carried by a support member which is mounted to the underside of the lid for pivoting about an axis parallel to the axis of the lid hinge, and wherein the spring bias means comprises at least one spring between the support member and the underside of the lid.

20
4. A printer as claimed in any preceding claim, wherein a paper guide is provided in the form of a sheet of flexible plastics material which is fitted into the main body portion of the housing to curve upwardly from adjacent the base of the body portion into contact with the feed roller.

25

5. A printer as claimed in any preceding claim,
wherein when the lid is closed a slot is defined between
the edge of the lid and the housing main body portion in
the region of, and substantially parallel to, the lid
5 hinge, the slot serving as an exit for the printed paper
from the housing.

6. A printer substantially as described with
reference to the accompanying drawings.

- 9 -

Patents Act 1977
Examiner's report to the Comptroller under
Section 17 (The Search Report)

Application number

9123827.9

Relevant Technical fields

- (i) UK CI (Edition K) B6F, FAB, FBH, FKD, FPX
- (ii) Int CI (Edition 5) B410 15/04,25/312,25/316

Search Examiner

R J DENNIS

Databases (see over)

(i) UK Patent Office

(ii)

Date of Search

20 FEBRUARY 1992

Documents considered relevant following a search in respect of claims

1 TO 6

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB A 2162794 CANNON	1 to 4 and 5
X	GB A 2121359 TOKYO	1 to 4 and 5
X	US 5030968 BENSON	1 to 4 and 5
X	US 4641980 FUJITSU	1 to 4 and 5
X	US 4614949 RICOH	1 to 4

Category	Identity of document and relevant passage	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☒ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.